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Date of Signature and Deposit: March 19, 2002

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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventors: Barney et al. Date: March 19, 2002

Serial No.: 09/664,519 Examiner: Davenport, A.

Filing Date: September 18, 2000 Group Art Unit: 1653

For: USE OF HOP ACIDS TO INHIBIT GROWTH OF STAPHYLOCOCCUS AUREUS AND PREVENT TOXIC SHOCK SYNDROME

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**RESPONSE**

Commissioner for Patents
Box Non-Fee
Washington, D.C. 20231

Sir:

These remarks are made in response to an Office Action dated December 19, 2001 in the above-identified application. In this Office Action, the Examiner rejected Claims 1-14 under 35 U.S.C. § 103(a) as being unpatentable over Nutter et al.

The Examiner argues that the Nutter et al. reference teaches the use of compositions from hop acids such as hexahydrolupulones as antibacterial agents. Specifically, the Examiner argues that the reference teaches the use of hexahydrocolupulone (HHC) against *Staphlyococcus Aureus*, and that it would have been obvious to one of ordinary skill in the art to use any known hop acids to kill bacteria or to act as an antibiotic as taught in Nutter et al.

The present invention is drawn to a method of killing, inhibiting or otherwise controlling the growth of *Staphlyococcus aureus* without preventing the growth of *lactobacillus*. The method makes use of compounds such as hexahydro beta acids, hexahydro beta salts, tetrahydroiso alpha acids, tetrahydroiso alpha salts, mixtures thereof, and combinations thereof, at specific concentrations that negatively affect the ability of *S. aureus* to grow and proliferate

while unexpectedly allowing *lactobacillus* to continue to survive. The present invention also includes compositions and products for practicing the method of the present invention.

One inventive aspect of the present invention is that the method allows users to inhibit the growth of *S. aureus* without disrupting the normal bacterial flora present in the application environment. The failure to maintain the normal bacterial flora may ultimately result in the onset of other bacterial infections and diseases. For example, the administration of a compound that inhibits *lactobacillus* in the normal vaginal flora may have the added affect of promoting the establishment of other less desirable microorganisms. For instance, a low number of *Candida albicans* are generally present in the vagina of many healthy asymptomatic women, but the administration of a compound that inhibits the growth of *lactobacillus* may allow *C. albicans* to grow and predominate, resulting in a yeast infection.

It was previously believed that the application of certain hop acids to a microenvironment containing *lactobacillus* would ultimately result in the killing of the *lactobacillus* in the microenvironment. In fact, Nutter et al. teaches on page 5, lines 5-7, that hexahydrocolupulones inhibit the growth of *lactobacillus*. One of ordinary skill in the art would thus expect the application of the hop acids as taught by Nutter et al. to have the added affect of also killing the *lactobacillus* in the application environment. As a result, it would not be obvious to one of ordinary skill in the art to apply the hop acids in the environments as taught by the present invention, or in a composition or product as claimed by the present invention, as the prior art suggests that such an application would disrupt the normal bacterial flora of the environment and increase the possibility of other bacterial infections and diseases.

The Applicants have discovered that it is possible to effectively kill, inhibit or otherwise control the growth of *S. aureus* without preventing the growth of *lactobacillus*. As illustrated in the example set forth on pages 6 to 8 of the specification, the application of the hop acids at the indicated concentrations provided the unexpected result of killing, inhibiting, or otherwise controlling the growth or proliferation of *S. Aureus* while not preventing the growth of *lactobacillus*. Because of this discovery, a solution now exists for preventing *S. aureus* infections, such as Toxic Shock Syndrome, without causing a substantial disruption in the normal bacterial flora of the application environment.

The methods of the present invention may also be applied in a manner not suggested by the Nutter et al. reference. The Nutter et al. reference teaches the introduction of the HHC

compound into the body of the user by oral or parenteral administration. Here, the compounds of the present invention may be applied topically using various delivery systems including absorbent materials (such as a tampon, wound dressing, suppository, disposable diaper, or sanitary napkin), or a pharmaceutically acceptable carrier (such as a douche or topical ointment), or a barrier contraceptive. It would not have been obvious to modify the teachings of Nutter et al. to employ these delivery systems as one of ordinary skill in the art would recognize that the application of the hop acids as suggested in Nutter et al. would ultimately result in the killing of the *lactobacillus* in the application environment and the disruption of the environment's normal bacterial flora. For example, one of ordinary skill in the art would not contemplate using the claimed hop acids in either a tampon, suppository, disposable diaper, sanitary napkin, douche, or a barrier contraceptive as such use may result in a yeast infection.

For the foregoing reasons, the Applicants respectfully submit that Claims 1-14 are not made obvious by the Nutter et al. reference and are in a condition for allowance. The Applicants therefore request reconsideration of the merits of this application.

No fee is believed due in connection with this response, however, should any fee be due, please charge the fee to Deposit Account No. 17-0055. Should any extension of time be due in this or any subsequent response, please consider this a request for the appropriate extension of time and a request to charge any fee due in that regard to the same deposit account.

Respectfully submitted,

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